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No. 1

FURTHER NOTES ON ALBERTA LEPIDOPTERA, WITH DESCRIPTION OF A NEW SPECIES.

BY F. H. WOLLEY DOD, MIDNAPORE, ALTA.

(Continued from Vol. XLVI, p. 403.)

603. *Hadena violacea* Grt.—A specimen taken at Banff on Sept. 20th, 1901, by Mr. Sanson. I have also a few British Columbia records.

604. *Hyppa indistincta* Sm.—I took a female at light at the Laggan Chalet on July 18th, 1907. It agrees with the figures and description of the female type from Mt. Hood, Oregon, which I have seen in the Brooklyn Museum. This was stated to be a male in the description. I have a similar female from Kaslo, and have seen others in Mr. Cockle's collection. Dr. Dyar records the species as *indistincta* in the Kootenai List, but suggests that both *brunneicrista* Smith and *rectilinea* Dyar (not Esper), from Alaska, are the same thing.

As to the distinctness of *brunneicrista* I have little doubt. *Indistincta* wholly lacks the rusty fulvous marks characteristic of that species, and the terminal line in both my specimens is slightly angulated in the submedian interspace, where it is preceded by a blackish crescent-shaped cloud edged with a few chocolate brown scales of the same shade as the lower portion of the median area. In this respect it resembles *xylinoides* rather than *brunneicrista*, which lacks the black crescent-shaped cloud in the submedian interspace, in which the rusty fulvous shade is paler than any of the brown shades on the wing. The angle, however, does not seem obvious in Smith's figure, and may be variable. The maculation of *indistincta* is, as its name implies, less distinct than in the others, and the general colour more dull and even, without the contrasting white. In my Laggan specimen the black line on the collar is incomplete centrally, but in the Kaslo example the collar is damaged. No such line is referred to in the description. The wing form is that of *brunneicrista*, and shorter than *xylinoides*.

I have examined the Alaskan specimens in the Washington Museum, which were referred to *rectilinea* by Dyar. I should call them *indistincta*. Of the five specimens, only one is a male, and that lacks antennæ. That is most unfortunate, as I have seen no other male which I could call *indistincta*, and the other three North American Hyppas, which include the No. 177 of my Calgary list, are separable from each other by male antennæ. European *rectilinea* is nearest my No. 177 on both antennal and other characters.

605. *Helotropha reniformis** Grt.—Taken at High River by Mr. Thomas Baird, in 1912.

606. *Momaphana comstocki* Grt.—A fine male, taken, I think, on an electric light pole at Edmonton on May 13th, 1914, by Mr. Valentine Fernekes, to whose generosity I am indebted for the specimen. The type in the British Museum is a much worn male from New York, and there is also a good female there from Orillia, Ont. Hampson gives a wood-cut of the type, but the black markings there shown are too numerous and too intense. Making allowance for that, the Edmonton specimen agrees so well with the wood-cut, Hampson's description, and my notes, as to make me feel confident in the determination. Another type is said to be in the Cornell University at Ithaca, N. Y. The species appears to be very rare everywhere.

A species which has for many years passed under this name in B. C. collections, was described as *Feralia columbiana* by Smith in CAN. ENT., XXXV, p. 9, Jan., 1903, from two males, one from New Westminster, B. C., from Dr. Fletcher, and the other from "North West Territory," from Dr. Ottolengui. A figure of the type is in the British Museum, and is copied by Sir George Hampson. The green of my only two specimens of *columbiana*, which are males, is much darker than that of *comstocki*, and in this and most other characters of colour and pattern, Smith's species has, as he pointed out in the description, more resemblance to *jocosa* than to *comstocki*. The orbicular and reniform of *comstocki* are larger and the wings wider in proportion to their length. As to the generic characters, I do not feel quite sure that the proboscis of my *columbiana* is non-functional, as that of *jocosa*

*Not verified.

appears to be, though Mr. Day tells me that he is not aware that the species has ever been taken either at treacle or fallows. And as to veins 6 and 7 of secondaries arising from upper angle of cell in *Feralia*, as described by Hampson, they do in one of my *columbiana*, but in the other are most distinctly stalked.

607. *Homohadena infixa* Walk.—Very rare. I have only three Alberta specimens in the collection. A female, head of Pine Creek, July 23rd, 1901; a male from the Red Deer River, July 6th, 1905; and a male from Edmonton, May 14th, 1918, the latter taken by Mr. F. S. Carr, at light. The female was included in my original notes under *badistriga* (No. 181). Walker's type of *infixa* is a badly worn male from Florida. Type *kappa* Grt. is a male from Kansas, and apparently the specimen figured by Hampson. They appeared to me to be the same species. I have eleven specimens from Cartwright, Man., and have labelled one of these as very like type *kappa*.

Dinalda Smith was described in Journ. N. Y. Ent. Soc., XVI, p. 94, June, 1908, from a male from Winnipeg, and a female from Sandy Lake, Newfoundland, both in the Rutgers College collection, where I have seen them. The male is labelled July 19th, 1897, apparently by Mr. Hanham. I made no comment on the female, so presumably accepted them as one species. I noted that the male was a small gray species, and probably the same as that in my collection from Manitoba, which I had compared with the type of *kappa*. Messrs. Barnes and McDunnough figure a Southern Manitoba female in their Contributions II, No. 1, Pl. XI, fig. 14, as *dinalda*, concerning which they say on page 24: "Probably this species, judging from the description; we have not seen the type. It is probably identical with *fifia* Dyar, from Kaslo, B. C., which we do not know." I feel confident in referring *dinalda* to *infixa*, though typical specimens of *infixa* are rather larger and browner, as are some of my Manitoba series.

Fifia Dyar was described in CAN. ENT., XXXVI, p. 30, Feb., 1904, from two specimens from Kaslo, as a variety of *badistriga*. I saw a female type at Washington, and noted that it was a species strange to me, though I had previously had a Manitoba specimen of *infixa* labelled "*badistriga* var. *fifia*" by Dyar himself.

I have no Kaslo specimens of any *Homohadena* in my collection, and have always been in doubt as to the identity of *fifia*. But if I am to accept Dr. Dyar's identification, which would not seem unreasonable, that would make *fifia* a synonym of *infixa*, and distinct from *badistriga*, from which latter I have always been inclined to dissociate it. Hampson's published figure of *fifia* is from a figure sent him of the type, and may be misleading. I have compared my Calgary female *infixa* with the same figure from which Hampson's was taken, and my note is: "Extremely like figure of *fifia* in British Museum, but more even on costa and with darker thorax." The evidence, therefore, seems to point to *fifia* being *infixa*, but at present I must leave the matter open. Holland's Plate XXI, fig. 1, is *infixa*, and not *badistriga*, as stated. *Badistriga* is much more strigate, and has the transverse lines more deeply curved.

In the Rutgers College collection I saw a photograph labelled *retroversa* Morr., presumably of the type in the Tepper collection. My note on this, says: "It looks to me almost exactly like the male type of *dinalda* Smith," with which I compared it. In that case Hampson's figure under *retroversa*, which is copied from a figure of a specimen in the U. S. National Museum, can hardly be correct. Barnes and McDunnough have a coloured figure of type *retroversa*, described, I believe, from Missouri, and figure a specimen from that state as agreeing with it. (Contr. II, No. 1, pl. XI, fig. 11.) I have Manitoba and Alberta specimens of *infixa* resembling their figure very closely indeed. I dare comment no further.

608. ***Oncocnemis regina* Sm.**—Described from a male from Regina, the capital of Saskatchewan. The capture is attributed to the late Dr. James Fletcher, but may really have come from Mr. T. N. Willing. I have seen the type at Rutgers College. Mr. J. B. Wallis took a female at Lethbridge, Alta., on Aug. 21st, 1912, which I have examined and compared with the description, and judged to be this species, though it appeared to be much darker and less maculate than the type. Barnes and McDunnough, in Contr. I, No. 4, pl. III, fig. 20, figure as *regina* a Eureka, Utah, specimen, remarking: "Probably this species, though most

of our Utah specimens are decidedly suffused with pink on primaries." I have seen a large number of the species which they figure, and from the same locality, and should call it a rather pale form of *hayesi*, as I understand that. I have seen neither type nor description, but a Colorado specimen from the Grote collection is in the British Museum, and is figured by Hampson. It is much more ochreous than any of the seven Utah specimens in the collection, but I have a Gunnison, Colo., male which scarcely differs from Utah specimens in my series. It is not improbable, however, that *regina* may turn out to be but a pale form of *hayesi*, to which it is, at any rate, very closely allied.

609. *O. barnesii* Sm.—A female taken at Banff, on Oct. 17th, 1910, on an electric light pole, by Mr. Sanson. The specimen was rather worn, but agreed with the description of this species.

610. *O. levis* Grt.—Lethbridge, Alta. One pair, Aug. 24 and 26, 1912. Taken by Mr. J. B. Wallis, to whom I am indebted for the male.

611. *O. glennyi* Grt.—A male labelled Laggan ("B.C." in error, as usual), 5,000 ft., July 28th, is in the Rutgers College collection, and agrees with Sir George Hampson's figure of the type from Colorado. The specimen very likely came from Mr. Bean.

612. *O. chandleri* Grt.—A male from High River, but without date, taken by Mr. Thomas Baird, I have compared with the type of this species, from Colorado, in the British Museum. The type is paler and grayer, and a trifle ochreous, which mine is not. Another male came to light here on Aug. 29th of the present year (1914). A male taken at Lethbridge on Aug. 27th, 1912, by Mr. J. B. Wallis, and in his collection, is similar.

613. *O. figurata* Harv.?—A female from Lethbridge, July 8th, by Mr. J. B. Wallis. I have compared it with the type of *figurata*, from Nevada, in the British Museum. It differs in being more even in colour, in having the transverse lines more constricted in the submedian interspace, where they are joined by a diffuse black blotch instead of a fine line, and in entirely lacking

the fine black longitudinal streak from the cell to the termen near the apex. It differs similarly from Colorado specimens which stood under *figurata* in the Smith collection, and from the Eureka, Utah, specimen, figured as such by Barnes and McDunnough in Contr. I, No. 4, pl. III, fig. 22. That figure appears to have a black collar not possessed by either my specimens nor by the type, though mine has a blackish head. The tegulae are disarranged as a result of papering, and may be dark inferiorly. The fore tibiae have a large claw on the inner side, and a small one on the outer, as Hampson says of type *figurata*.

614. *Platagrotis speciosa* Hbn. var. *arctica* Zett.?—I have two Alberta specimens which I refer doubtfully to this form. A male which I took at the Chalet lights at Laggan, on July 14th, 1904, and a female which turned up at treacle on Pine Creek on August 16th of the same year. I submitted both to Dr. Dyar some years ago, and he called them *speciosa*. A similar male taken by Mrs. Nicholl in Wilcox Pass during 1907 is in the British Museum, and has been recorded as *speciosa* var. *arctica*, by Sir George Hampson in Can. Ent. XL, p. 102, March 1908. The species has long been known in Northern Europe, and both names were first applied to European forms. The typical form in Europe is, as Hampson describes it, "gray white, strongly irrorated with black-brown." Against var. *arctica* in Staudinger's catalogue is a note in Latin, which translates: "smaller, darker, with hind wings nearly unicolorous." Sir George Hampson says of var. *arctica*: "small and dark, with the markings indistinct—Alpine and Arctic." Walker's type of *mixta* is a female from St. Martin's Falls. My note describes it as "gray, black-sprinkled," and, regarding more of the British Museum series continues: "Others, Hudson's Bay and White Mountains, are much like it, and rather smaller only than the usual run of European examples." I have European specimens in my collection which I picked from a series submitted to me to show the considerable variation, and one from Labrador, probably collected by Möschler, sent me by Bang Haas, as var. *arctica*, is more plainly maculate and not nearly as dark as some of those. The Alberta specimens differ in being of a much more bluish dark gray throughout, and in bearing a peculiar resemblance, as regards the primaries, to

Scotogramma perplexa, which occurs also both at Laggan and on Pine Creek, and with which I formerly confused them, before noting the very different generic characters.

I have seen in the British Museum Morrison's male type of *perquirilata* from Mt. Washington, but have no further note thereon.

615. *P. gelida* Sparre-Schneider, var. *mevesi* Auriv.?—I have examined four specimens, all males, taken at Banff by Mr. Sanson, which I refer doubtfully as above. Dates are Aug. 19th, 1909; Aug. 19th, Sept. 1st and 5th, 1911. One of these is in my collection. The others are in that of Mr. Sanson, and one of these I have compared with the British Museum material. On the strength of that comparison I recorded the species as *sincera* H.-S. in 43rd Rept. Ent. Soc., Ont. (1912), p. 119, 1913, notwithstanding that, as there stated, I found the form to resemble more closely some specimens standing under *gelida*. *Sincera* is European, and stands in our North American lists as from Labrador. Hampson adds: "U.S.A., mountains of northern and middle states." *Gelida* has not previously been recorded from North America. In January of the present year (1914), I again examined the British Museum series under both names, though I had then no Banff specimen with me. From my notes I conclude that a specimen standing as "ab. *mevesi* Auriv." from Bergen, Norway, agreed with the Banff form better than did anything else there, and so tentatively I record it. Comparing it with typical *gelida*, Hampson says of *mevesi*: "Browner: fore wing without the pinkish patch on the reniform; hind wing more irrorated with brown." Hampson refers both *gelida* and *sincera* to *Anomogyna* Staud., with which the present form agrees structurally.

616. *P. imperita* Hbn.—Calgary July 23rd, 1908, at light; and Didsbury Aug. 5th and 8th, 1905; all taken by by Mr. C. G. Garrett. Banff, July 30th to Aug. 4th, four specimens, by Mr. Sanson. One Calgary and two Banff specimens are in my collection. One of these I have compared in the British Museum, and have labelled it as being like Labrador specimens there standing, and smaller only than the female type *discitincta* Morr. from St. Martin's Falls. Hübner's figures, which I have carefully

examined, were from Labrador specimens. A Rama, Labrador, specimen in my collection, from Prof. Smith, is slightly smaller than the local series, and differs in being less blue-gray, and a trifle ochreous.

617. *Protagrotis nichollæ* Hamps.—(Can. Ent., XL, 102, March, 1908). Described from Alberta and B.C. material taken by Mrs. Nicholl. The male type is from Simpson River, 7,000 ft., Aug. 13th, 1904, and the female type from Glacier, 4,100 ft., Aug. 3rd, 1907. Both localities are in B.C. The rest are four Alberta specimens, three males and a female, Wilcox Peak, July 29th and 31st, 1907, and Brobokton Creek, Aug. 12th, 1907. I am not aware that I have ever seen any other specimens. The impression received after viewing the specimens on two different visits, was that the species somewhat resembled a large *Scotogramma* near *promulsa*. Hampson places the genus *Protagrotis* after *Eurelagrotis* and *Rhynchagrotis* at the end of his vol. IV.

618. *Semiophora elimata* Guen.—Banff, July 28th, 1910. One male. N. B. Sanson. The specimen is near the var. *badicollis* Grt. as diagnosed by Hampson, that is having the black markings strong. I have seen neither the type nor description of that form. For a further note on this species, vide Ent. News, XXIV, 359, Oct. 1913.

619. *Setagrotis vernilis* Grt. syn. *filiis* Smith.—(Smith, Trans. Am. Ent. Soc., XXXIII, 127, April 1907; Dod, Ent. News, XXIV, 361, Oct. 1913, re syn.) Banff, Aug. 14th—Sept. 11th, 1910-11, Sanson. Laggan, Aug. 9th, in Prof. Smith's collection, probably from Mr. T. E. Bean. Grote's type is a male from Colorado in the British Museum, and one of my Banff specimens agrees with it exactly. Smith described *filiis* from a single male from Pullman, Washington. When I first saw the type in his collection I took it for an unusually dark blue-gray form of *infimatis*. At that time I did not know *vernilis*, as the species which I had standing wrongly under that name in my collection, and which I recorded as *vernilis* in 41st Rept. Ent. Soc. Ont., 1911 (the "Entomological Record" for 1910, p. 10), was *vocalis*.

(To be continued).

GEOMETRID NOTES — REVISION OF THE GENUS
HYDRIOMENA HUB., GROUP WITH
LONG PALPI.

BY L. W. SWETT, BOSTON, MASS.

This group may be distinguished from the groups with short and moderate palpi by the greater length of these appendages, which are beak-like; the slightly larger size and the slighter variability in colour. The prevailing shades seem to be olive-green and white with variations of black and less of the red, except in *Hydriomena ruberata* Freyer. I have regarded *H. speciosata* Pack. as typical of this group, because it is less confused in general collections than the other species.

14. *Hydriomena speciosata* Pack., (Proc. Boston Soc. Nat. Hist., XVI, p. 22, 1874; Monog., p. 102, 1876).

This large, showy, green and white, mottled species is fairly well known to the average collector. The long beak-like palpi are typical of this group. The specimen figured by Packard in the Monograph (Pl. VIII, fig. 37) is a variety and not the one from which the original description was drawn. I have limited the type to the one from which the original description was drawn, there being two distinct forms before him at that time. The type is the green form with white mottlings and the one figured in the Monograph is the black-bordered variety, which I described in the Can. Ent. as *Hydriomena speciosata* Pack., variety *agassizi* Swett (vol. XLII, p. 277, Aug. 1910). The normal form of *speciosata* I have from British Columbia and California and I should not be surprised if it had quite an extended range even through South America as there are several closely-related forms figured in the Biologia Cent. Amer. The typical *speciosata* is dark olive-green with a white ground colour and five black bands crossing the fore wings, and has black dots at the ends of the veins and a black apical streak. The margin of the fore wing is greenish where in the variety *agassizi* it is intense black. The

hind wings of both are dark and smoky. The types (2 ♂, Mendocino City, Calif., Alexander Agassiz) are in the Museum of Comparative Zoology, Cambridge, Mass. It is a rather rare species but Mr. E. H. Blackmore, of Victoria, B.C., took a nice series, the dates of capture ranging from June 29 to Aug. 10, 1913.

Hydriomena speciosata, var. (a) **agassizi** Swett, (Can. Ent., vol. XLII, Aug. 1910). This is the form figured by Packard in the Monograph, Plate VIII, fig. 37, under *speciosata*, to which I have just alluded. *Agassizi* seems to be a variation towards melanism, the entire outer border being black, with green and white mottlings. The central band is twice as wide in *agassizi* as in *speciosata* and the whole insect has a black appearance. It is evidently a rare variety as the type is the only specimen I have seen. The type (1 ♂, Mendocino City, Calif., Alexander Agassiz) is in the Museum of Comp. Zoology, Cambridge, Mass.

Hydriomena speciosata, var. (b) **taylori** Swett, (Can. Ent., vol. XLII, p. 277, Aug. 1910).

This seems to be a colour variety of *speciosata* in which the green and white is replaced by a brownish-olive. It seems to be local, as I have never seen it from any place but Vancouver Island, where it has been taken at Nanaimo and Victoria. The type was submitted to me by the late Rev. G. W. Taylor, as he was uncertain of the characters of the true *speciosata*, having been misled by the figure of one form and the description of another.

Type, 1 ♂, July 22, 1908, from Rev. G. W. Taylor, Departure Bay, in my collection. Cotype, 1 ♂, in the collection of Mr. A. J. Croker, July 1, 1909, Victoria, B.C. Other specimens from Victoria, July 3, 1913, have been received from Mr. E. H. Blackmore.

15. **Hydriomena costipunctata** Barnes and McD. (Contrib. to Nat. Hist. of Lepid. of North America, vol. 1, no. 5, p. 33, July 1912; plate II, fig. 14).

This form is closely allied to *speciosata* and also to some of the Mexican species, but Dr. Barnes, with his large series, has no doubt been able to see the distinguishing characters. Personally, I regard it as a variety of *speciosata* Pack., the figure, as judged by plates, are sometimes rather unreliable as they do not bring out the minute differences. It has a purple-brown ground colour and apical patch and lacks the median white shading of *magnificata*. It may be that *H. magnificata* Taylor belongs to the group with long instead of the group with moderate palpi as I listed it. When I was working on this group the Rev. G. W. Taylor sent me a photograph of his type but the palpi were blurred and appeared to be of moderate length. Shortly after this I wrote him about the matter, but unfortunately illness prevented him from replying. Now that his collection has passed into Dr. Barnes' hands I can ascertain its position from the latter.

H. costipunctata, according to the colour, must be close to var. *taylori* Swett.

Types, 1 ♂, 1 ♀, Tucson, Ariz., in the Barnes collection.

16. **Hydriomena barnesata** Swett, (Can. Ent., vol. XLI, July, 1909; Barnes and McD., Contrib. Nat. Hist. Lepid. North Am., vol. 1, no. 4, 1912; pl. XIV, fig. 19-22).

This species has very long palpi, possibly the longest of the group, and the general appearance is different from any of the others. The broad smoky mesial band with its three black lines, and the clear white mesial space beyond make it resemble in a way some of the German varieties of *autumnalis* with pointed or elongated wings. The general colour is olive-green and white. The hind wings are dark smoky brown. It is a large species and evidently rather rare as I have only seen a few specimens, three from Dr. Barnes and one from Mr. Grossbeck.

Types, 3 ♂ (coll. Barnes, 2 ♂; coll. Grossbeck, 1 ♂), Huachuca Mts., Ariz. Paratype, 1 ♂, Palmerlee, Ariz., in my collection. Through the kindness of Dr. Barnes, I also have 1 ♀ from Fort Wingate, N. Mex., which does not differ materially from the male.

(To be continued.)

NORTH AMERICAN DIPTERA.

BY J. R. MALLOCH, F.E.S., URBANA, ILL.

The new species described in this paper were taken during a field trip in connection with an investigation of the occurrence of *Simuliidæ* in the southern part of the State of Illinois. The types are deposited in the collection of the Illinois State Laboratory of Natural History. This paper is published by permission of Dr. Stephen A. Forbes, State Entomologist.

The present opportunity may be taken to draw attention to a curious error which occurs in my paper on *Simuliidæ*.^{*} In the last page proof there appeared a period after the word *Simulium* in the first caption of the generic table. In making the change to a comma the compositor, evidently by mistake, took out the last line of table instead of last line of caption I, thus causing the same line to appear twice, and deleting the alternative to caption 2, which should read, "Face broad, basal cell absent....*Prosimulium*, p. 24."

Botanobia hinkleyi, new species.

Female.—Black. Frons reddish brown, slightly obscured by grayish pollen, the anterior fourth pale yellow, surface hairs yellow; ocellar triangle opaque; face obscure, whitish yellow; antennæ brown, the lower portion of third joint, especially towards base and on inner side, yellowish; arista brown; cheeks concolorous with face, obscured with gray posteriorly; clypeus gray; proboscis brown; palpi yellow. Mesonotum black with dense gray pollinosity, which obscures the surface, with the exception of the areas occupied by four longitudinal vittæ, those areas shining; pleuræ black, upper half gray pollinose, lower half highly glossy; scutellum slightly gray pollinose, but shining; thoracic hairs brownish yellow, the bristles black. Abdomen distinctly shining, with but slight indications of dusting; surface hairs soft, white. Legs yellow, black on coxæ except their apices, femora except narrowly at apices, the fore and mid tibiæ at the middle, the hind tibiæ except their bases, and on the apices of the tarsi; surface hairs pale. Wings clear, veins brown. Halteres pale yellow, the stems brownish.

^{*}Tech. ser. No. 26, Bureau of Entomology, April 6, 1914.
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Frons slightly less than one-half the width of head, the surface hairs short, though numerous, those on the lateral margins not long, though setulose; triangle short and broad, not reaching to middle of frons, and not half as broad as frons at vertex; antenna with third joint as broad as cheek at middle, which is equal to one-third the height of eye; cheeks with many soft hairs, which are very short, the anterior hair distinguishable, but not vibrissalike; a distinct ridge traverses the cheek mid way between the eye and the lower margin; eye slightly higher than long, pubescent. Surface of mesonotum unpunctured, the space between the median pair of vittae impressed; surface hairs numerous, though short, and regularly distributed; bristling normal; scutellum haired as mesonotum, and with four marginal bristles, the basal pair very much shorter than the apical pair, the latter not closely approximated, cruciate; surface of scutellum convex, its outline rounded. Abdomen ovate, as long as thorax. Legs normal. Wing with a distinct break at apex of auxiliary vein, which vein is traceable; first costal division subequal to second, third one half as long as latter; inner cross-vein at a little before the end of first vein; the distance between its upper extremity and the inner cross-vein about three-fourths the length of last section of fifth vein, and one-third as long as last section of fourth; veins 3 and 4 subparallel.

Length 2 mm.

Type locality.—Dubois, Ill., April 24, 1914. Taken by sweeping evergreens (J. R. Malloch).

Paratype.—Same locality. Taken by sweeping. Related to *trigramma* Loew, from which the difference in the thoracic markings, especially, will serve to separate it.

Named in honour of Mr. A. A. Hinkley, the well-known conchologist, on whose ground the species was taken, and to whom we are indebted for much hospitality.

Agromyza aristata, new species.

Female.—Black; thorax very densely covered with pale gray pollen, entirely opaque; abdomen less densely pollinose, slightly shining. Head bright yellow, only the upper third of frons, includ-

ing the ocellar region, and back of head black, with grayish pollinosity; antennæ, palpi and proboscis yellow; arista and head bristles blackish, the former yellow at base. Thorax without pale markings, except below wing base, where it is obscurely yellowish. Legs yellow, including the coxæ. Wings clear, veins brown, fourth and fifth less distinct than the others. Squamæ yellow, fringe concolorous, margin brownish. Halteres yellow, knobs whitish.

Frons about one-half the head width, orbits poorly defined; four pairs of orbital bristles present, which are of moderate strength, the anterior two pairs incurved, the posterior two backwardly directed; frontal triangle not well defined; antennæ of moderate size, third joint disc-like, arista tapering, bare, very short, its length barely exceeding the height of the third antennal joint; cheek at posterior margin as high as eye, at anterior margin about one-half as high, marginal hairs weak and pale, vibrissa black and well differentiated, though not strong. Mesonotum with four pairs of dorso-central bristles, which decrease slightly in strength anteriorly, the anterior pair slightly in front of suture, about five irregular rows of discal setulæ between the anterior dorso-centrals; the pair of bristles between the posterior dorso-centrals of moderate length. Abdomen ovate, penultimate segment short, ovipositor rather short and broad; posterior margins of all segments with distinct bristly hairs, which are most noticeable on the last segments. Legs of moderate strength, their surfaces with short black hairs; mid tibia without posterior bristles. Wings slender; costa indistinguishable from slightly beyond apex of third vein; veins 3 and 4 gradually divergent on their apical portions; fourth vein reaching wing margin at about same distance behind apex of wing as third vein does before apex; auxiliary vein indistinct; inner cross-vein distinctly beyond apex of first, and near to apical third of discal cell; last section of fourth vein about six times as long as penultimate section; last section of fifth vein about four-fifths as long as penultimate section.

Length 2 mm.

Type locality.—Gleason Dune, Havana, Ill., April 30, 1914 (Hart & Malloch).

Paratypes.—Havana, April 30 and May 1, 3 specimens; Golconda, Ill., April 18, 1914, on bank of Ohio River, and St. Joseph, Ill. May 3, 1914, 3 specimens (Hart & Malloch).

Male.—Similar to the female in coloration, bristling and venation. The hypopygium is normal in size and yellowish in colour.

Allotype.—Same data as type.

This species, through its possession of a pale yellow face and frons and the discontinuance of the costal vein, will run down to section 13 in my table of species in this genus,* but may readily be separated from the two species included there as follows: From *brevicostalis* Malloch by the lateral margins of the disc of mesonotum being concolorous with the disc, and from *davisi* Walton by the yellow antennæ. *Parvicella* Coquillett is a much more slender species than *aristata*, and is essentially different in many respects.

The food plant of *aristata* is unknown, the specimens being the result of general collecting in different situations.

***Agromyza pruinosa* Coquillett.**

It may be of interest to record the occurrence of this species at St. Joseph, Ill., on May 3, 1914. The writer took three females on the bank of Salt Fork, by sweeping the branches of various trees. River birch (*Betula nigra*) is recorded only for the southern part of the State, and no birch trees occur at the place where the insect was taken, so that it must feed upon some other tree here. Further investigation may be made to discover its habits in this locality.

***Agromyza infumata*, new species.**

Male.—Black. Head black, frons opaque on centre stripe, orbits and ocellar region shining; apex of proboscis pale brown. Mesonotum shining, but with distinct brownish pollinosity; vertical pleural suture and below wing base brown; squamæ gray, margin and fringes brown. Abdomen shining black, without pollinosity. Legs black. Wings slightly grayish, veins dark brown. Halteres yellow, knobs white.

*Am. Ent. Soc. Amer., Vol. 6, 1913, p. 271.

Frons at vertex about one-half the width of head, at anterior margin slightly over one-third the head width; orbits well defined, five pairs of orbital bristles present, the anterior three pairs incurved, the upper two pairs backwardly directed, all the bristles moderately long but fine, orbital hairs weak; frontal triangle distinct, not reaching to middle of frons; antennæ normal in size, third joint rounded; arista thickened at base, tapering to beyond middle, bare, its length equal to anterior width of frons; face very slightly concave; cheek barely as high as third antennal joint, at its highest point about one-fourth as high as eye, marginal hairs numerous, but weak, vibrissæ differentiated but not strong; eye higher than long. Mesonotum with four pairs of dorso-central bristles; discal setulæ distinct, but not very numerous, about five irregular lines between the anterior dorso-centrals; no bristles between the posterior pair, the setulæ continued to between the latter. Abdomen rather slender, the surface with numerous rather strong hairs; hypopygium normal. Legs with short surface hairs; no posterior bristles on mid tibia. Costa to end of fourth vein, which is almost exactly at wing tip; auxiliary vein indistinct, but complete, not fused with first; veins 2, 3 and 4 distinctly divergent apically; outer cross-vein oblique, its upper extremity in vertical line with apex of first vein; inner cross-vein at middle of discal cell; last section of fourth vein about eight times as long as penultimate section; last section of fifth vein twice as long as penultimate section; sixth vein almost reaching wing margin.

Length 2 mm.

Type locality.—Dubois, Ill., April 24, 1914, taken by sweeping in woods (Hard & Malloch).

This species belongs to the group which is dealt with between captions 28 to 34 in my table of species in *Agromyza*, above referred to, and is most closely related to *fragariae* Malloch, from which it may readily be separated by the very different wing venation. This character also serves to distinguish the species from any other in this group, as does also the absence of the mid tibial bristles. Food plant unknown.

SOME CHALCIDOID HYMENOPTERA FROM NORTH QUEENSLAND.

BY A. A. GIRAULT, NELSON (CAIRNS), AUSTRALIA.

The types of the following species are in the Queensland Museum, at Brisbane.

Family TRICHOGRAMMATIDÆ.

LATHROMERINI.

Genus *Lathromerella* Girault.1. *Lathromerella fasciata* Girault.

Five females of this beautiful species were taken June 3, 1913, by sweeping the forested slopes of Mount Pyramid (from 1,500 to 2,500 feet), Nelson, North Queensland, by Mr. Alan P. Dodd. The metathorax plus propodeum are black on each side having a wide mesial portion concolorous (dorsal aspect). The two ring-joints are verified.

Genus *Lathromeroides* Girault.1. *Lathromeroides fasciativentris* n. sp.

Female.—Length 1.30 mm.

Exactly similar to the type, *longicarpus* Girault, but the abdomen banded with four or five black cross stripes. The black dot under the stigmal vein is surrounded with suffused blackish. Two ring-joints. Mandibles tridentate.

Male.—Not known.

Described from one specimen captured with the foregoing *Lathromerella*.

Habitat.—Australia, Nelson (Cairns), Queensland.

Type.—The above specimen on a slide. Later, the species was compared with the type of *longicarpus*. It is distinct.

Chaetostrichini

Genus *Neobrachista* Girault.

The antennæ in this genus were wrongly described as bearing but one funicular joint; there are two but the first is wider than long and not very distinctly separated, though distinct enough in specimens of the following new species. In the type species, however, it is still shorter and resembles more one of the ring-joints except that it is wider and is intimately connected with the

funicle. The genus is distinguished from *Brachistella* and *Abbella* by its very short marginal vein, and its long, slender stigmal. It is gratifying to me to be able to throw light on this point.

1. *Neobrachista novifasciata* n. sp.

Female.—Length 1.00 mm.

Closely allied with the type species, *fasciata* Girault, but more robust, the abdomen broader (a little wider than the thorax, distinctly narrower in *fasciata*), and with but three black stripes across it, one a little out from base, the second a little distad of the middle, and the third a little distad of the mid-distance from the second to apex. The first funicle joint is a little longer and more distinct (yet not quite half the length of the second which is a little wider than long; in the type species the first joint is only about a fourth the length of the second which is a little longer than wide). Second, black stripe of abdomen interrupted at the meson, the others continuous and straight. Mandibles tridentate. Also the fore wings are shorter and broader, subtruncate at apex (bearing about 26 lines of discal cilia across the widest point). Fore wings slightly clouded, more distinctly under the stigmal vein and along the venation. Thorax with a *distinct* median sulcus (not present in the single specimen of the type species before me though slightly indicated in places, nevertheless plainly absent), as deep as the parapsidal furrows.

Male.—Not known.

Described from a single specimen captured with the above *Lathromerella*.

Habitat.—Australia, Nelson (Cairns), Queensland.

Type.—The above specimen on a slide with two ♀'s of *Lathromerella fasciata* Girault.

Family MYMARIDÆ.

Genus *Polynema* Haliday.

1. *Polynema zolai* n. sp.

Male.—Length 1.50 mm. Large.

Jet black, the wings hyaline, the venation black, also the antennæ (but the pedicel brown) and the legs except the tarsi, knees, tips of tibiæ and all of cephalic tibiæ which are brown. Characterized by the wings which are broad, subtranslucent and

with short marginal fringes the longest of which are only about a sixth the greatest wing width; only about twelve lines of discal ciliation which is scattered, most numerous cephalo-distad and practically absent over all of the proximal half of the blade which is about two and a quarter times longer than broad. Antennæ longitudinally striate, the joints shortening distad, the proximal joint of funicle as long as the second, somewhat brownish, the club joint a little longer than the distal funicle joint which is about a fourth shorter than joint 1 of the funicle, the latter about $2\frac{1}{2}$ times longer than wide at the base. A very short, narrow, minute ring-joint is present.

Female.—Not known.

Described from one male specimen given to me by Mr. A. P. Dodd, who captured it by sweeping the edge of jungle, May 20, 1913.

Habitat.—Australia, Kuranda, North Queensland.

Type.—The above specimen on a slide.

Respectfully dedicated to Emile Zola for his "La Débâcle," wherein the horrors of war are ably pictured to us.

2. *Polynema speciosissimum*, n. sp.

Female.—Length 1.50 mm. Large, the fore wing banded.

Black, the head except the dusty vertex, the prothorax and mesonotum reddish brown. Petiole of abdomen, coxæ, cephalic femora, all trochanters and proximal half or more of all tibiæ, white. Tarsi reddish brown, also the scape and pedicel. Funicle joints 4 and 5 white, antennæ and legs otherwise black, except tips of front tibiæ, which are yellowish. Fore wings banded as in *franklini* Girault, but the cross-band is very intense jet black and decidedly longer, distinctly less than its own length from the apex of the venation. Scape not distinctly sculptured, the first funicle joint elongate but only $\frac{2}{3}$ the length of the second, which is very long, subequal to the third, both longest; joint 1 longer than 6, subequal to 4, which is slightly longer than 5 (funicle). Cross-band of fore wing followed by a broad, naked area from margin to margin, the black band itself one and a third times longer than wide (cephalo-caudad). Sculpture inconspicuous. Discal cilia in the black band very dense and longer than the fine, shorter,

less dense ciliation distad, the longest marginal cilia about three-fourths the greatest wing width.

Male.—Unknown.

Described from a single female captured by sweeping in a jungle-pocket, June 4, 1913. This species is certainly one of the most remarkably coloured mymarids known.

Habitat.—Australia, Nelson, North Queensland.

Type.—The above specimen on a slide.

Genus *Gonatocerus* Nees.

1. *Gonatocerus competi* Girault.

A single very pale female of this species was taken on May 29, 1913, at an elevation of 1,500 feet, forest, Nelson, North Queensland. A round spot is present on the base of the scutellum.

(To be continued.)

A NEW GENUS AND A NEW SPECIES OF
LEPIDOPTERA FROM ARIZONA.

BY WM. BARNES, M.D., AND J. MCDUNNOUGH, PH.D., DECATUR, ILL.

Having had occasion to examine the types of the species described as *Mamestra antonito* Barnes (Can. Ent., vol. 39, p. 14, 1907), we were surprised to find that the ♂ and ♀ types represented respectively two entirely different species, structurally widely apart, neither of which could remain associated with the genus *Mamestra*, or *Polia*, as it is now called by Hampson.

The ♂ type, labelled *Barathra antonito*, which we figured in our "Contributions," vol. I, no. 4, pl. VI, fig. 6, and from which the original description was drawn, has hairy eyes, a fact which led to its being placed in *Mamestra*; the mid and hind tibiae are, however, distinctly spined, which would throw it into Hampson's subfamily *Agrotinae*, and associate it with the two genera, *Ala* Staud. and *Trichorthosia* Grt., the only two described genera combining hairy eyes and spined tibiae; of these *Ala* contains several Heliothid-like moths from Central Asia which have nothing in common, apart from the above mentioned features, with *antonito* Barnes; *parallela* Grt., the type of the genus *Trichorthosia* is, as the name implies, rather Orthosian in appear-

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ance and is further characterized by the flat hairy appressed thoracic vestiture with slight tuft of metallic scaling on metathorax and no abdominal tufting. In *antonito* Barnes the thoracic vestiture is loose and composed chiefly of large spatulate scales; there is a slight divided tuft on the metathorax and a small tuft on the basal abdominal segment; the ♂ antennæ show a rather peculiar structure in that they are very strongly lamellate, each lamella being considerably excavated centrally, the two ends thus projecting far beyond the central portion and presenting to a casual glance the appearance of bipectinations; the fore tibiæ are unarmed, the palpi short, upturned, with 3rd joint rather porrect and the tongue is well developed; the species evidently represents a new generic type for which we would propose the name *Mimobarathra*; besides the ♂ type of *antonito* we have six further ♂'s from White Mts., Ariz., before us from which we have drawn up the above generic characterization. The so-called ♀ type of *antonito* Barnes labelled "So. Arizona, Poling" does not, as already mentioned, belong to this species at all; it has naked eyes, unspined tibiæ, the fore tibiæ however with well developed apical claw on inner side; the thoracic vestiture is composed of loose spatulate scales, but the specimen is too rubbed to determine the nature of the tufting. It would fall into Hampson's subfamily Acronyctinæ and according to his tables belong either to the genus *Copanaria* Grt. or to *Leucocnemis* Hamp. It is apparently undescribed and bears but little affinity to the already described species of either of these two genera, but as the specimen is considerably worn we dislike to create a new genus for it and place it provisionally in *Leucocnemis* Hamp. with following characterization:—

***Leucocnemis barbara*, sp. nov.**

Head and thorax clothed with an admixture of white, black and pale ochreous scaling; primaries white, heavily sprinkled with smoky, the ground colour almost obliterated and only showing distinctly in subterminal area; basal area sprinkled with orange scaling, especially before lower portion of t. a. line, which is black, outcurved and lunulate; orbicular round, orange, with dark centre and black outer line; reniform broad, figure-of-eight-shaped, open above and below, with pale centre broadly margined with

orange, the whole surrounded by black line; t. p. line single-dentate, sinuous, black, shaded outwardly above vein 1 with orange, this shading covering entire s. t. space; s. t. line indicated by broken orange scaling on dark blotches; fringes checkered white and black. Secondaries smoky, paler in basal half and slightly hyaline, crossed by an indistinct smoky line. Beneath, primaries smoky, secondaries as above. Expanse 30 mm.

Habitat.—South Arizona (Poling). One ♀.

Type.—Coll. Barnes.

FIELD NOTES AND QUESTIONS.

Interesting New Jersey Captures.

On April 7, 1914, a large Carabid was taken at Arlington, N.J., from a case of Japanese azaleas. Mr. E. A. Schwarz to whom it was sent identified it as *Damaster blaptoides* Kollar and said that it was a rather rare species, the genus being peculiar to Japan. Inasmuch as it is a beneficial insect its introduction into the United States would be desirable.

Eucactophagus graphipterus Champion was taken during April, 1914, in a greenhouse at Summit, N.J. This member of the family Calandridæ was determined by Mr. Schwarz who has the following to say concerning it, "Very interesting; a native of Costa Rica and U.S. of Columbia; only three specimens are known. The one figured in Biol. Centr.-Amer., vol IV, part 7, plate IV, fig. 35, was found by Prof. Britton in a greenhouse at Connecticut. Larvæ and other biological material of this species are greatly desired by the U.S. National Museum, also more information regarding nature of damage to orchids."

HARRY. B. WEISS, New Brunswick, N.J.

Callopietria floridensis Guen. in New Jersey. The work of this insect known as the Florida Fern Caterpillar or the Southern Fern-Cutworm was first noted in New Jersey at Weehawken, Riverton and Rutherford during September and October, 1914, where the larvæ were doing considerable damage to ferns in greenhouses, attacking such species as *Adiantum*, *Cyrtomium*, *Nephrolepis*, *Pteris*, *Polypodium*, *Blechnum* and *Asparagus sprengeri*. Both forms of larvæ were present with the

green ones largely in the majority, although the black ones were by no means scarce. Handpicking of the caterpillars and shaking of the infested plants supplemented by "swatting" the moths at night with the ordinary wire "fly swatters" gave the best results. Light traps and stale beer and molasses attracted only a few moths. Paris green and hellebore burned the foliage as did arsenate of lead to a slight extent. The chief objection to arsenate of lead was the discolouration of the foliage, which followed its use. Poisoned bran and molasses was not successful, as the larvæ preferred the ferns. A detailed account of this insect can be found in Bull. 125, Bur. Ent. U.S. Dept. Agric., by F. H. Chittenden, and in the 27th Report of the State Entomologist of Illinois which contains an article by J. J. Davis. Inasmuch as neither of these publications mentions the hatching period of the egg, I might say that eggs under my observation hatched in from five to seven days. Considering the fact that it is a troublesome species once it gains a foothold in the fern house, it would pay fern growers to be on the watch for it when receiving plants from other establishments. It can be readily transported in the egg, larval and pupal stages.

HARRY B. WEISS, New Brunswick, N.J.

Priophorus acericaulis MacG. in New Jersey. This saw-fly known as the Maple Leaf-Stem Borer is listed in Insects of New Jersey as being very local and recorded from South Orange. During May and June, 1914, it was found injuring maple trees on the property of Mr. T. Romaine, Hackensack, N.J. The leaves started to drop about May 20th, and in a few days the ground beneath the infested trees was covered. Mr. Romaine had observed this unusual pest for the past four years and during that time it had not spread at all to adjoining maples. An account of its life history by Dr. W. E. Britton can be found in Ent. News, vol. 17, Nov., 1906, and acting on the suggestion contained therein, kerosene emulsion at the rate of one to twelve was applied twice to the ground beneath the trees while the larvæ were entering. It is somewhat unusual to run across the work of this insect which is not by any means common.

HARRY B. WEISS, New Brunswick, N.J.

POPULAR AND ECONOMIC ENTOMOLOGY.

(This is the first of a series of articles, which, it is hoped, will appeal to our amateur readers and those primarily interested in agriculture. They are not offered as original contributions to science, but may incidentally contain new observations.—Ed.).

SOME INHABITANTS OF A SAND PLAIN IN JUNE.*

BY NORMAN CRIDDLE, TREESBANK, MAN.

The locality chosen for this paper is a drifting, undulated sand plain, some two miles in length and not more than half that distance across at its widest point. It is surrounded on three sides by low, sparsely-grassed, sand dunes, not infrequently scalloped out and bare to the south, and having a denser, or even luxuriant vegetation on the north side. Between these ridges are low, undulated valleys, which in early days were thickly wooded, and often contained small ponds. Now much of the larger timber has been destroyed by fire and the ponds are dry. Scattered over all this area, however, are still numerous white spruce, while aspen poplars are again rapidly making their way through the often dense willow scrub.

On the east of our plain is a large bog extending for a number of miles, containing the usual vegetation including larch, black spruce, birch and a variety of small shrubs and plants too numerous to mention.

On the sand plain, itself, with which we are chiefly concerned, are several islands of trees, surrounded, that is, by sand, and upon which are larch, poplars, birch, willow, maple, cherry, etc., while in the valleys sheltered from the actual drift may be found *Elæagnus argentea*, *Arctostaphylos uva-ursi*, *Petalostemon candida* and *P. villosa*, *Senecio manitobensis*, wild sunflowers and others.

The sand itself is yellowish-white and on account of constantly drifting, remains permanently wet a few inches below the surface. It is this condition that enables it to support the plants mentioned above as well as a binding grass, *Orizopsis cuspidata*, and two others which grow extensively, namely, a stout form of *Andropogon furcatus* and *Calamagrostis longifolia*.

The date of our trip is June 20th—the locality Aweme, and Province Manitoba.

*Contributions from the Entomological Branch, Department of Agriculture, Ottawa.

January, 1915

Almost the first plant to attract our attention as we climb into the loose sand is the beautiful Veined Dock, *Rumex venosus*. Just now, however, its chief attraction lies in the fact that it harbours three different species of beetles. First there is that bright little Chrysomelid, *Gastroidea formosa*, whose colour is in striking contrast to the sand, but harmonizes, instead, with the plant it feeds upon. Then there is an active, narrow, black beetle, probably *Anthicus monticola* Casey, and lastly a species closely related to the famous Alfalfa Weevil, namely, *Phytonomus quadricollis*. This beetle is very apt to be overlooked unless we inspect the plants closely, its colour both above and below being almost identical with the sand, and then it has a habit of clinging to the stems near their base when it often becomes partly buried by the drift. Lastly, added to its remarkable protective colouration, are its habit of shamming death whereby it may easily be lost among the sand. The larvæ feed upon the plant and later spin silken cocoons among the leaves, where they change to pupæ, and towards autumn to beetles, passing the winter in this stage, presumably buried among the leaves and sand.

Having passed the objects just discussed and climbed upon the sand to where it is level, probably the first object to attract us will be a species of tiger beetle called *Cicindela limbata*, a beautiful little creature which delights in the pure drifting sand with perhaps on odd clump of grass for shelter. It is here in hundreds running actively about and readily taking wing when disturbed; but it is not a strong flier and consequently seems to depend largely upon its protective colours to escape capture, which, however, avails little when man is the hunter. Larval holes are common enough, being more often met with in the valleys where they are somewhat sheltered from the wind. They are quite shallow burrows, in fact, the shallowest of any of our local species. Two sizes occur at this time, those containing larvæ that are about to change to pupæ, and others much smaller which have yet a full year in which to do so.

A collector visiting a situation like this for the first time, and not knowing the habits of tiger beetles, is apt to be disappointed if the day be either unusually hot or cold. For while every

indication points to a profitable hunting ground, there will hardly be a beetle in sight. Experience, however, teaches that appearance is often deceptive, and here we have no exception to the rule. In reality the beetles are merely hiding from heat or cold, as the case may be. Personally, I have found such periods among the most profitable for collecting, as one soon gets to recognize the peculiar little heaps of sand thrown out as a badger would throw it out, with the entrance carefully closed. These heaps of sand are more compact than those of wasps so common here, and are therefore easily recognized. The holes are always on a slant, and can be readily traced by pushing a stalk of grass along them. Then by moving the sand carefully the beetle will be revealed ready to rush out, which it will do and escape too, if one is not careful. Their temporary homes are seldom more than six inches long and are never used more than once. On cold or rainy days, however, they will be occupied until the return of fine weather.

As a rule, tiger beetles retire beneath the ground each night, but occasionally some species at least, acquire that desire for travelling, which is common to nearly all creation in some shape or form and which, of course, is one of the chief factors in the distribution of animals. Then they disregard all their usual habits and with other diurnal insects fly long distances at night, often indeed in the very darkest of nights. Some species of *Cicindela*, however, do this travelling in the day time when, of course, they run a greater risk of falling a prey to birds.

Moving down into a hollow, sheltered by spruce and Wolf Willow (*Eleagnus*), where the sand is no longer drifting, but still shows many bare spots among the sparse herbage, we encounter a form of *Cicindela lecontei* recently described as a new species by Colonel Casey. It is an interesting tiger beetle, varying from greenish-bronze to rich wine colour and usually having the white markings united into a continuous marginal band. It is not a strong flier, but on account of its habit of remaining on the ground and running to the edge when a net is thrown over it, it often escapes. The larval holes are common here in company with those of *Cicindela lengi* (*venusta*). The latter, however, prefer rather more open situations, as does also the adult.

It is bordering the habitat of *C. lecontei* but nearer the drifting sand, that we meet with the finest of all our tiger beetles, a large strong-flying insect which will often travel three hundred feet or more at a stretch. This is *C. manitoba* Leng., next to *limbata*, the commonest on the sand. He is a great terror to ants and other small insects, nor does he take amiss medium-sized beetles, in fact there is one, *Disonycha quinquevittata*, a regular pest on a sand-binding willow (*Salix longifolia*), which seems to form a goodly proportion of the tiger's food. The larvæ of *C. manitoba*, while very similar to other species, are quite original in their methods of constructing a burrow. Other species have nearly a straight hole usually at right angles to the surface, but *manitoba* constructs a cup-like pit into which the burrow enters horizontally from one side and then gradually curls downwards to a perpendicular position. The advantage of this is that it forms a regular death trap to the unsuspecting insect which happens to be crawling near. Possibly this simple method of procuring food is at least in part responsible for the larger size of the species.

Returning again to the centre of the sand we encounter a longish valley blown almost down to water and sheltered by sand banks. Here on a hot day, we shall encounter all the tiger beetles already mentioned, as well as *obliquata*, *12-guttata* and *repanda*. Among the wet sand here are numerous heaps of sand evidently shoved up by an animal burrowing straight downwards. Select a fresh one and dig carefully to five or six inches and you will discover a roundish beetle rather like a large lady-bird beetle superficially, which in reality, however, belongs to the Carabidæ and is *Omophron americanum*.

In the higher spots are the larval holes of another tiger beetle called *C. lepida*. They are right on the drifting sand and one wonders how the insects manage to keep their holes open or procure sufficient food in such a desert. As a matter of fact there is evidence to indicate that such unfavorable conditions have at least lengthened the larval life to a year beyond the average. Should we be lucky enough to discover a mature larval burrow we might, at this time, trace from it that of the pupal chamber which is the longest I have yet come across. The larva when mature

constructs a burrow branching out semi-horizontally from the original one, commencing about two inches below the surface and having an average length of nine inches, though some I examined extended for eleven. The burrows slant downwards to a depth of five inches from the surface at their extremity. Here in an enlarged chamber the pupa develops, and afterwards the beetle. The adult of *C. lepida* appears toward the end of June and is as perfect as can well be in its colour resemblance to the sand. It is a very weak flier, due doubtless to its being far safer on the sand in its deceiving dress than it ever would be in an attempt to escape by flight.

Lepidoptera are not very much in evidence here in June, but there are a few prizes well worth scouting for. Should we venture to the edge near the swamp we should probably see several butterflies not strictly belonging to the sand, such as our old friend *Eneis jutta*, common enough farther in. Returning to the drier sand we may with good luck see a great rarity called *Copablepharon convexipennis*, though I have no records before July. This species is generally at rest on the sand and unless one is very carefully on the lookout—for it is another sand colour mimic—it will have departed almost before we are aware of its presence.

Among the spreading shoots of *Salix longifolia* may be found a sandy-coloured cutworm, probably *Agrotis aurulenta*. Its work is plain enough to see, but it prefers as a resting place the cool moist sand, and may, therefore, be several inches below the surface.

Another moth very rare at this time, but common a month later, is *Pseudotamila awemensis* Dyar, found as yet nowhere else. Its fore-wings, like so many other creatures found here, resembles the sand, but the secondaries are pure black. It may be found throughout July resting on the sand, or more often on the flowers of Skeleton Weed, *Lygodesmia juncea*.

Among Orthoptera various species of grasshoppers are in evidence, chiefly, however as nymphs. *Hippiscus latifasciatus* is common, as elsewhere, but to my eye looking rather paler than its brethren of the prairies, as if there were an attempt to harmonize just a little with the sand. *Hippiscus neglectus* turns up on the edges of our tree islands or upon the borders of the sand in small numbers.

Then there are various species of *Melanoplus*, viz. *atlanis*, *angustipennis*, *packardi*, *scudderi*, and probably one or two others. None as yet, however, have reached the winged state. We shall also observe *Ochrilidea ciherea* and perhaps *Amphitornus bicolor* in the more grassy spots. But, the most interesting of all and the only species that can in any way be called indigenous to sand is *Trimerotropis agrestis*. It is present over the whole area in various stages of development, but what makes it particularly interesting is its close resemblance in colour to the sand. It seems to have an instinctive knowledge of its protective colouration, and as a result individuals will be found quite motionless often partly buried. The advantage of such protection is, of course, obvious. On a bare area such as it inhabits, contrasting colours would at once attract the attention of birds, such as crows, robins and others, found in the vicinity, but with a dress matched so perfectly detection is reduced to a minimum.

Of bees and wasps there are numbers, a rich collecting ground for a student of the Hymenoptera never as yet worked over. Among the curiosities to a novice are numbers of large semi-cylindrical cocoons originally buried, but often exposed by the winds having shifted the sand. They belong to a large clumsy predaceous wasp (*Bembex pruinosa*), which late in the season becomes a perfect nuisance, buzzing noisily around one's person after flies. To those who do not know they prove quite a terror and I have seen some interesting movements due to fear of being stung. As a matter of fact, however, they appear to be exceedingly harmless, and I have never observed them sting anything larger than a fly, which they use as food for their larvæ.

We shall also meet with numerous true flies (Diptera) though the majority of them are not indigenous to the sand but have been reared in the bog close by—tabanids are there in thousands and it is hardly safe at times to take horses into the vicinity. They do not particularly trouble mankind, however, and on the sand, males are often more plentiful than females, indeed they can be seen hovering in every sunny glade but dart away like a flash when disturbed.

A few flies, however, make their homes here. One, a very pretty Bee-fly, probably belonging to the genus *Exoprosopa*, I

caught some years ago, just emerging from a spot where I had previously marked a *Cicindela* burrow, and as the latter was no longer present I suspect the fly of having been the cause, particularly as Prof. V. E. Shelford records an allied genus as preying upon the larvæ of tiger beetles. Several other species are known to be parasitic, and one has the distinction of destroying locust eggs.

Lastly, as part of the fauna, there is a very beautiful spider (*Geolycosa*) which burrows large holes in the sand, as winter approaches going down five or six feet, but at this time they are comparatively shallow and the females are often but a few inches down with a host of young clinging to their backs. When disturbed with a straw they bite it savagely, and can bite hard too, but curiously enough they have a mortal dread of the various black wasps found later on, which usually paralyze and make use of them for food. I have seen the spiders make frantic efforts to escape from a wasp half their size and eventually when escape was impossible, turn over on their backs and fight, but they fought in despair with the knowledge of almost certain death awaiting them, and thus it always ended. The wasp while keeping at a safe distance was eventually able to use her sting, and soon after was dragging the spider to her burrow.

CATERPILLARS AS WEATHER PROPHETS.

In a Toronto newspaper there recently appeared an article taken from the "New York American," in which a forecast is given of the weather during the approaching winter, stating that "after the most intense cold weather we have experienced for years we shall have a mild spell and great thaws and floods; we shall have a very late and backward spring, with real winter at the time we should have fine spring-like weather. The caterpillar shows light in front, followed with a very well-defined spot of considerable size, and this dark indicates our mid-winter snap. Then the light appears again, and this indicated the warm spell, and if there was no more dark there would be a prospect of a very early spring, but another dark spot appears toward the rear of the caterpillar, and this will bring the late and unseasonable cold at a time we should have our mild weather."

Further on it is stated that "corn husks and the chaff of grain were heavier this season than common, and weed seeds are obtained in heavier coverings than are usually noticed. Larvæ of insects are deeper in the earth. Field mice and other burrowing animals are going deeper, and bark of new wood is much thicker, and weeds are thicker where roots will need protection. All these indicate severe freezing."

The prophet does not tell us what caterpillar he found, but if he had met with a banded larva of the Milkweed Butterfly (*Danais plexippus*), he might have foretold the whole year of uniform variations during each month, as shown by the stripes on each segment. This is the first time that predictions have been based, so far as we know, upon the markings of caterpillars.

C. J. S. B.

BOOK REVIEW.

THE GENITALIA OF THE BRITISH GEOMETRIDÆ. By F. N. Pierce, F.E.S., The Elms, Dingle, Liverpool, Eng., 1914. Clothbound, price 10/-.

This is a companion volume to the work on the "Genitalia of the British Noctuidæ" published by Mr. Pierce in 1909 and it is gratifying to learn that the reception accorded it was so encouraging that not only is the volume on the Geometers before us, but the author promises that an account of the Genitalia of the Tortricidæ will follow at an early date.

The superficial resemblances that exist between many species of the Geometridæ of Europe and those of North America and especially of Canada have led to endless muddles in our lists, some collectors and authors considering them identical while others are equally certain that they are not. Having now such excellent drawings and descriptions of these structural details of practically every one of the British species, made not from one slide of each but from five or six up to over twenty specimens, and checked and rechecked by the author and his friend, the Rev. C. R. N. Burrows, F.E.S., we should be able to determine whether in our related N.A. species these structures show positively that they are distinct or that they are the same species.

Turning to the book, the introduction gives the names and descriptions of the various parts, a few of which have been altered from those used in the *Noctuida*, so as to adopt names which had the right of priority of usage and it is to be hoped that no further changing will be necessary.

This is followed by a classification of the British species based on the male and female genitalia, comprising 78 pages. The family is divided into two primary divisions, designated as *Gnathoi* and *Agnathoi*, according to whether the gnathos is present or absent. The former comprises ten and the latter fifteen sub-families, producing an arrangement quite unfamiliar and which will no doubt give food for thought and pen to those who hold that no classification should be based on one set of characters only.

The figures of the male organs are given on 48 plates—the name of the species being printed below each drawing—a decided improvement on having numbers and a key somewhere else. In many cases the female genitalia are figured to the left of the male.

The book and its illustrations, showing not only the diversity but also the wonderful beauty of these structures as exhibited in one single family, cannot help being of the greatest interest to Lepidopterists and I am sure that the author will gladly extend to any of our readers the privilege offered the writer in a recent letter, namely to give his assistance in forming opinions on the connections of certain species or genera.

A. F. WINN.

WE would remind our readers that subscriptions are now due, and that these and all other business matters connected with the Society or Magazine, such as advertisements, requests for back numbers, etc., should be addressed, *not to the Editor*, but to

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